UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,818	06/30/2003	Makaram Raghunandan	42P16525	3019

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EXAMINER
HUSSAIN, TAUQIR

ART UNIT	PAPER NUMBER
2152	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
Office Action Summary	10/611,818	RAGHUNANDAN, MAKARAM
	Examiner	Art Unit	
	Tauqir Hussain	2152	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>30 June 2003</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-40</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-40</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>11/09/2004, 02/13/2006</u>.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-40 are pending in this application.

Claim Objections

2.   Claim 1, is objected to because of the following informalities: Claim 1, has

repetition in line 2 as "identifying data to be <u>to be</u> added to a trie". Appropriate correction

is required.

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
> matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
> conditions and requirements of this title.

4.   Claim 28-40, are rejected under 35 U.S.C. 101 because, in the light of

specification on page 6, [0058], applicant has provided that applicant intends the

medium to include transmission media as such claim is drawn to a form of career

waves, signal, light waves, infrared signals and digital signals. Carrier waves or signal

does not fall into one of the four categories of invention and therefore, Claims 28-40 are

not statutory. Signal is not a series of steps or acts and thus is not a process. Signal is

not a physical article or object and such is not a machine or manufacture. Signal is not a

combination of substances and therefore, not a composition of matter.

Claim Rejections - 35 USC § 112

5.   Claim 5, has an antecedent basis, as there is no second trie block is mentioned

in claim 1. Appropriate correction is required. There is insufficient antecedent basis for

the limitation in the claim.

6.   Claim 27, recite, "pruned-trie entry includes **the** trie-entry portion". It is not clear

whether this trie-entry is first trie-entry or second trie entry. There is insufficient

antecedent basis for the limitation in the claim.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

8.   Claim 1-40, are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kevin et al. (GB 2350534 A), hereinafter "Kevin" in view of Baskins et al. (Patent No.:

EP 1265161 A2), hereinafter "Baskins".

9.   As to claims 1, 28 and 35, Kevin and Baskin discloses the invention substantially,

including, identifying data to be to be added to a trie (Kevin, page.3, lines 18-19),

separating the data into portions having sizes based, at least in part, on sizes related to

trie blocks in the trie (Kevin, page.3, lines 19-21, where blocks are trie blocks with in a

block of memory), indicating in a trie entry of a first trie block, wherein a first portion of

the data identifies the trie entry, that a second portion of the data is stored in a pruned-

trie entry (Kevin, Fig.2, Element-21, page.3, lines 22-23, where header information is in

the first block and has a pointer for another block which indicates the size of that block ,

pointer could be the pruned-trie entry).

Kevin is silent on storing the second portion of the data in the pruned-trie entry

and indicating in the pruned-trie entry the position the second portion of the data

occupies relative to other portions of the data. However, Baskins discloses, storing the

second portion of the data in the pruned-trie entry (Baskin, [0022, lines 1-8, where

accessing the data structure means that information is stored as explained above in the

second portion of the header e.g. a pointer in a pruned-trie entry) and indicating in the

pruned-trie entry the position the second portion of the data occupies relative to other

portions of the data (Baskins, [0022, lines 8-13]).

Therefore, it would have been obvious to one ordinary skilled in the art at the

time the invention was made to combine the teachings of Kevin with the teachings of

Baskins in order to provide an adaptive digital tree data structure to incorporate a rich

pointer object, including both conventional address redirection information used to

traverse the structure and supplementary information used to optimize tree traversal,

skip levels, detect errors and store state information.

10.   As to claims 16, 32 and 38, Kevin and Baskin discloses the invention

substantially, including, identifying in a data packet an address of a network device

(Kevin, page.1, lines 16-17, where destination address is a network address);

locating, in a first trie block of a trie data structure, a first portion of a prefix that

matches a corresponding first portion of the address, wherein the first portion of the

prefix identifies a trie entry of a first trie block (Kevin, page.2, lines 16-22, where data base is divided into two parts and pointer result field identifies the trie entry of a first trie block);

determining whether the trie entry of the first trie block indicates that a trie-entry portion of the prefix is stored in a pruned-trie entry (Kevin, page.2, lines 16-22, where data base is divided into two parts and second part of the database contain the pruned-trie entry e.g. pointer related information for the next block)

if the first trie entry indicates that the trie-entry portion of the prefix is stored in the pruned-trie entry (Kevin, page.2, lines 16-22, where result field determines whether there is an entry for a trie block):

determining from the trie entry of the first trie block a location of the pruned-trie entry (Kevin, page.2, lines 21-22);

determining whether the trie-entry portion of the prefix matches a second portion of the address that occupies the same position in the address as the trie-entry portion occupies in the prefix (Kevin, page.2, lines 22-23, where, if it is determined that the packets may have the same next hop than there will be a match of fields in the trie block).

Kevin is silent on if the trie-entry portion matches the second portion of the address, whether a trie entry of a second trie block indicates a location of a next hop address, wherein the trie entry of the second trie block is identified by a second portion of the prefix matching a third portion of the address. However, Baskins discloses, on if the trie-entry portion matches the second portion of the address, whether a trie entry of

a second trie block indicates a location of a next hop address, wherein the trie entry of

the second trie block is identified by a second portion of the prefix matching a third

portion of the address (Baskins, [0022, lines 10-18], where, pointer information contains

the address of the next level, this pointer information could be the third portion of data

which has the information of the next level/block, where as this third portion is still

residing in the second trie block); and determining the next hop address from the trie

entry of the second trie block, if the trie entry of the second trie block indicates the

location of the next hop address (Baskins, [0022, lines 1-6, where redirection pointer is

the next hop address).

11.   As to claims 2, 29 and 36, Kevin and Baskin discloses the invention substantially

as in parent claim 1, 28 and 35, including, indicating in the trie entry of the first trie block

a location of a second trie block Baskins, [0022, lines 1-6], where header information

belongs to the first block which also contain the pointer, pointing to the next level); and

    indicating, in a trie entry of the second trie block, a location of additional data

associated with the data, wherein a third portion of the data identifies the trie entry in the

second trie block (Baskins, [0022, lines 10-18], where, pointer information contains the

address of the next level , this pointer information could be the third portion of data

which has the information of the next level/block, where as this third portion is still

residing in the second trie block).

12.   As to claim 3, Kevin and Baskin discloses the invention substantially as in parent

claim 1, including, wherein the pruned-trie entry is located in the first trie block (Kevin,

Fig.2, Element-21, Page.5, line 31 and page.6, line 1, where header is a first block and

header information is separated into MAC address and destination address and they

both exist in the same block, further destination address could be a pruned-trie entry

located in the first block).

13.   As to claim 4, Kevin and Baskin discloses the invention substantially as in parent

claim 1, including, wherein indicating that the second portion of the data is stored in the

pruned-trie entry of the first trie block comprises storing the second portion in the trie

entry of the first trie block (Kevin, page.4, lines 3-8, where pruned-trie entry for the

second block is residing in the first trie block).

14.   As to claim 5, Kevin and Baskin discloses the invention substantially as in parent

claim 1, including, wherein the pruned-trie entry is located in the second trie block

(Baskins, [0022, lines 10-18], where, pointer information contains the address of the

next level, this pointer information could be the third portion of data which has the

information of the next level/block, where as this third portion is still residing in the

second trie block).

15.   As to claim 6, Kevin and Baskin discloses the invention substantially as in parent

claim 5, including, wherein indicating that the second portion is stored in the pruned-trie

entry comprises setting a bit to indicate that the second portion is stored in the pruned-trie entry (Kevin, page.4, lines 10-12, where all the pointers which are pruned-trie entry are in number of bits).

16.   As to claim 7, Kevin and Baskin discloses the invention substantially as in parent claim 5, including, wherein indicating that the second portion is stored in the pruned-trie entry comprises setting a pointer to point to the pruned-trie entry (Kevin, page.4, lines 10-14).

17.   As to claims 8, 30 and 37, Kevin and Baskin discloses the invention substantially as in parent claims 2, 28 and 35, including, wherein the data comprises a prefix (Kevin, Fig.2, Element-21, where header is prefix).

18.   As to claims 9 and 31, Kevin and Baskin discloses the invention substantially as in parent claim 8 and 28, including, wherein the additional data comprises a next hop address (Kevin, page.2, lines 10-14, where next router address is next hop).

19.   As to claim 10, Kevin and Baskin disclose the invention substantially as in parent claim 1, including, wherein the sizes related to the trie block comprise the sizes of the first trie block, the second trie block and the pruned-trie entry (Kevin, page.4, lines 3-8, where first block contains the first trie block entry key, pointer, the second trie block and a result field, a pruned-trie entry).

20.   As to claim 11, Kevin and Baskin disclose the invention substantially as in parent claim 1, including, wherein the first portion comprises a root portion and the second portion comprises one or more portions following the root portion (As explained in claim 1, header information is the first thing analyzed in the communication device and pruned-trie has the information related to the second block, therefore first portion has to comprise of root portion which is the first trie-block, Kevin, Fig.2, Element-21, page.3, lines 22-23, where header information is in the first block and has a pointer for another block which indicates the size of that block , pointer could be the pruned-trie entry).

21.   As to claim 12, Kevin and Baskin disclose the invention substantially as in parent claim 1, including, wherein the first portion comprises a non-root portion and the second portion comprises one or more portions following the non-root portion (Kevin, page.2, lines 20-21, where result field not being set means first portion is a non-root portion).

22.   As to claim 13, Kevin and Baskin disclose the invention substantially as in parent claim 1, including, wherein indicating the position of the second portion comprises adding to the pruned-trie entry an indication of the position of the second portion (Baskins, [0022, lines 13-17, where next level pointer's "point" will be the position of the second portion).

23.   As to claim 14, Kevin and Baskin disclose the invention substantially as in parent

claim 13, including, wherein the indication of the position comprises a range of bit

positions (Baskins, [0022, lines 13-17, where population counts can be interpret as bit

positions).

24.   As to claim 15, Kevin and Baskin disclose the invention substantially as in parent

claim 13, including, wherein the indication of the position comprises a mask that

indicates bit positions (Baskins, [0022, lines 13-17, where index digits can be interpret

as mask).

25.   As to claims 17, 33 and 39, Kevin and Baskin disclose the invention substantially

as in parent claims 16, 32 and 38, including, wherein the address comprises a

destination address (Kevin, page.2, lines 13-14, where address data for forwarding

packets to the next destination is the destination address).

26.   As to claim 18, Kevin and Baskin disclose the invention substantially as in parent

claim 16, including, wherein the pruned-trie entry is located in the first trie block (Kevin,

Fig.2, Element-21, Page.5, line 31 and page.6, line 1, where header is a first block and

header information is separated into MAC address and destination address and they

both exist in the same block, further destination address could be a pruned-trie entry

located in the first block).

27.   As to claims 19, 21 and 22, Kevin and Baskin disclose the invention substantially

as in parent claims 18 and 20, including, wherein determining whether the trie entry of

the first trie block indicates that the trie-entry portion is stored in the pruned-trie entry

comprises determining whether a bit is set to indicate that the trie-entry portion is stored

in the pruned-trie entry (Kevin, page.4, lines 10-14, where it can be an obvious variation

to set a pointer to point to first block or second block).

28.   As to claim 20, Kevin and Baskin disclose the invention substantially as in parent

claim 16, including, wherein the pruned-trie entry is located in the second trie block

(Baskins, [0022, lines 10-18], where, pointer information contains the address of the

next level, this pointer information could be the third portion of data which has the

information of the next level/block, where as this third portion is still residing in the

second trie block).

29.   As to claim 22, Kevin and Baskin disclose the invention substantially as in parent

claim 20, including, determining whether a pointer is set to point to the pruned-trie entry

of the second trie block (Kevin, page.4, lines 10-14).

30.   As to claim 23, 34 and 40, Kevin and Baskin disclose the invention substantially

as in parent claim 16, including, further comprising determining from the pruned-trie

entry the position the trie-entry portion occupies in the prefix (Baskins, Fig.6c, where

pointer has the exact location of the pruned-trie entry, [0022, lines 13-16, where pointer

in the pruned-trie entry contains the position information).

31.   As to claim 24, Kevin and Baskin disclose the invention substantially as in parent

claims 23, 32 and 38, including, wherein determining the position the trie-entry portion

occupies in the prefix comprises examining an indication of a range of bit positions of

the trie-entry portion in the prefix (Kevin, Fig.3, page.6, lines 6-15 where number of bits

are used to determine entry points or fields).

32.   As to claim 25, Kevin and Baskin disclose the invention substantially as in parent

claim 23, including, wherein determining the position the trie-entry portion occupies in

the prefix comprises examining a mask indicating bit positions of the trie-entry portion in

the prefix (Baskins, [0022, lines 13-15, where index digits can be interpret as mask).

33.   As to claim 26, Kevin and Baskin disclose the invention substantially as in parent

claim 16, including, further comprising identifying, if the trie-entry portion fails to match

the second portion of the address, the next hop address indicated by the trie entry of the

first trie block (Kevin, page.2, lines 20-21, where identifying another trie block is next

hop address).

As to claim 27, is rejected for the same reasons as applied to claim 26 which

depends on claim 16 above and further, it will be an obvious variation to repeat the

process for third and more blocks until process finds a next hop address on any one of these blocks in any number of combinations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tauqir Hussain whose telephone number is 571-270-1247. The examiner can normally be reached on 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bunjob Jaroenchonwanit can be reached on 571 272 3913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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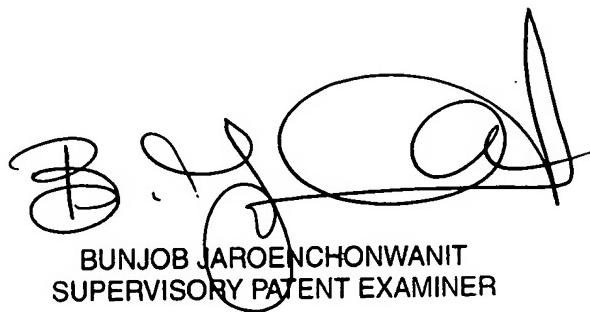
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